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Relativistic Heavy Ion Collider
Magnet Division Procedure

Proc. No.: RHIC-MAG-R-8858

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Title: Helical Magnet BPM Signal Cable Loop Assemblies

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REVISION RECORD

Rev. No.	Date	Page	Subject	Approval
A	11/2/99		Initial Release.	

1. Scope:

This procedure describes the method used to produce BPM Signal Cable Loop Assemblies for Helical Magnet Cold Mass Assemblies.

2. Applicable Documents:

RHIC-MAG-Q-1000	Procedure for Control of Measurement Test Equipment
RHIC-MAG-Q-1004	Discrepancy Reporting Procedure
BNL Dwg. 12011190	Helical Magnet BPM Signal Cable Loop Assembly
BNL Dwg. 12011180	Braided Copper Cable

3. Requirements:

3.1 Material & Equipment

3.1.1 Material

None

3.1.2 Equipment

Bending Jig	BNL Dwg. No. 25-1775.01-5
Tubing Hand Benders	

3.3 Procedure:

Note: Minimum Bend Radius for cables is .5 unless otherwise specified on Drawing.

3.3.1 Cable 3 Forming

3.3.1.1 Install tool template 3L.

3.3.1.2 Hand bend lower end of tube to match tool outline. With lower end held in place, bend tube around insert. Hand adjust cable until unsprung cable matches tool outline.

3.3.1.3 Remove cable and insert & set aside.

3.3.2 Cable 9 Forming

3.3.2.1 Install tool templates 9L & 9R.

3.3.2.2 Hand bend lower end of tube to match tool outline. With lower end held in place, bend tube around insert 9R. Hand adjust cable until unsprung cable matches tool outline.

3.3.2.3 Repeat 3.3.2.2 using insert 9L.

3.3.2.4 Remove cable and inserts & set aside.

3.3.3 Cable 6 Forming

3.3.3.1 Install tool templates 6L & 6R.

3.3.3.2 Hand bend lower end of tube to match tool outline. With lower end held in place, bend tube around insert 6R. Hand adjust cable until unsprung cable matches tool outline.

3.3.3.3 Repeat 3.3.3.2 using insert 6L.

3.3.3.4 Remove cable and inserts & set aside.

3.3.4 Cable 12 Forming

3.3.4.1 Install tool templates 12L & 12R.

3.3.4.2 Hand bend lower end to 180° shape as shown on tool template. With lower end held in place, bend tube thru 1^{st}, 2^{nd}, and 3^{rd} roller forms (from top of tool towards bottom), hand adjusting after each roller to match tool template. Hand bend tube from last roller to area of inserts 12L & 12R.

3.3.4.3 With lower end held in place, bend tube around insert 12R. Hand adjust cable until unsprung cable matches tool outline.

3.3.4.4 Repeat 3.3.4.3 using 12L.

3.3.4.5 Remove inserts.

3.3.5 Coil Twisting

Note: Minimum Bend Radius for cables is .5 unless otherwise specified on Drawing.

3.3.5.1 Locate all 4 cables to tool and clamp in place, taking care not to damage cables. Temporarily bend the lower end of tube 12 to clear winding block of tool. Install winding block to tool plate, making sure cables are not pinched, and remove movable portion.

3.3.5.2 Align upper ends of 4 tubes to each other. Install movable portion of winding block.

3.3.5.3 Using a rod inserted into movable portion of the winding block, slowly wind to bend tubes around mandrel into coil shape. Make sure coils remain even and move up the mandrel as shown on drawing.

3.3.6 Cable Assembly

3.3.6.1 Fabricate braided copper cable as shown on drawing 12011180.

3.3.6.2 Using solder & flux 12011393 /12011394, tin end of braided cable that wraps around signal cables. See drawing for location.

3.3.6.3 Trim tinned end of braided cable as shown on drawing.

3.3.6.4 Using solder & paste 12010070-01 /12010069, solder braided copper cable to braid block.

3.3.6.5 Solder braided copper cable to Signal Cables as shown on drawing.

Note: Do not heat cables above 300°F.

3.3.6.6 Mark Cables 3,6,9,12 as shown on drawing.

Cable Testing & Identification

3.3.7.1 C.A.D. Instrumentation Group to perform Time Delay Reflectometry test on completed Signal Cable Assembly. C.A.D. personnel to review results & determine acceptability of part for use.

3.3.7.2 Tag assembly and mark with part no. & rev. per MIL-STD-130.

4. Quality Assurance Provisions:

4.1 The Quality Assurance provisions of this operation require that the technician shall be responsible for performing all assembly operations in compliance with the procedural instructions contained herein and the recording of the results on the production traveler.

4.2 The technician is responsible for notifying the technical supervisor and / or the cognizant engineer of any discrepancies occurring during the performance of this procedure. All discrepancies shall be identified and reported in accordance with RHIC-MAG-Q-1004.

4.3 Measuring and test equipment used for this procedure shall contain a valid calibration label in accordance with RHIC-MAG-Q-1000.

5.0 Preparation for delivery:

N/A